



RESEARCH ARTICLE

Speech-Language Disorders in Congenital Toxoplasmosis: Literature Review

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Abstract

Introduction: Congenital toxoplasmosis causes calcifications in the brain and may alter the routes of cerebral stimuli reception. This implies in the necessity of an investigation of possible language disorders.

Objective: The objective was to analyze what is known about language disorders in congenital toxoplasmosis children in literature.

Methods: A literature review was conducted on the data bases Lilacs, Scielo, PubMed and Scopus by combining the following keywords: “Congenital Toxoplasmosis” and “Speech”, “Toxoplasmosis Congenital” and “Language”.

Results: 28 papers were found, the majority was published in Scopus and PubMed database in the period from 1984 to 2015. After careful reading and application of inclusion criteria, 2 articles remained for analysis in the present study, published in 2010 and 2014.

Conclusion: There are published only a few studies showing the possibility of association of language disorders and congenital toxoplasmosis, with low and moderate level of evidence.

Keywords

Speech, Language and Hearing sciences, Toxoplasmosis, Congenital, Language, Language disorders

which is transmitted intra-uterus to the fetus [1,2]. This infection can cause changes in neurologic development, as visual impairment and other neurological abnormalities [2-4].

The visual impairment in congenital toxoplasmosis is reported, for example, the low scores at the Snellen Test, which is based on the discrimination of fine intersecting lines [5]. However, the evaluation of the ophthalmologic impairment may have some limitations, were described difficulties for interpretation of the results due to specific limitations of the cognitive functions of the child and of the verbal skills [5].

Hearing disorders are also frequently reported in congenital toxoplasmosis, were diagnosed alterations at the peripheral level and also at the central auditory processing [6-9]. It should be noted that congenital toxoplasmosis is a risk factor for hearing loss according to ASHA’s position statement (2007) [10], although it’s important to notice that there’s peer reviewed literature showing absence of auditory problems in this population [1].

Knowing that language is a superior cognitive function and its development depends on the receptive pathways, among them the hearing and visual processes, the possibility of language disorders should be considered and must be investigated [11-14].

The aim of this study was to perform a literature review and analyze the published data on language disorder

Introduction

Congenital toxoplasmosis is defined as the infection acquisition caused by vertical transmission. During pregnancy, the mother is infected with *Toxoplasma gondii*,



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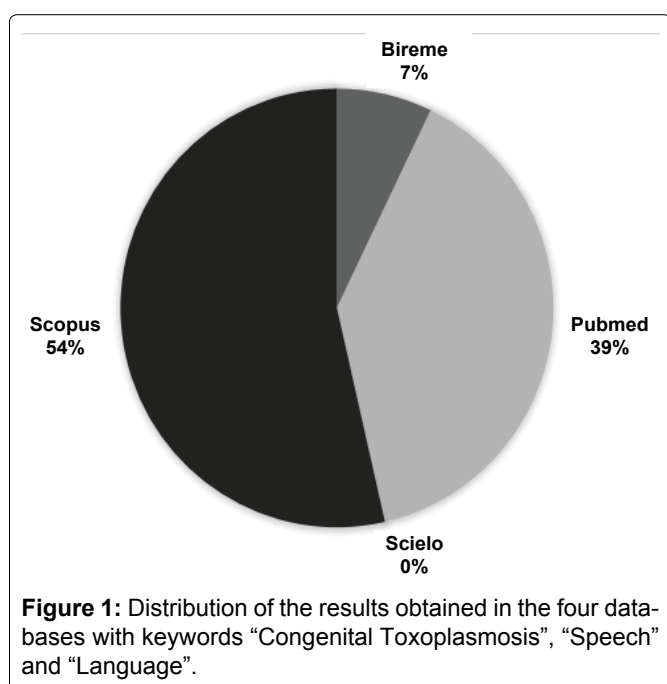
ders in congenital toxoplasmosis, to answer if communication disorders are associated with toxoplasmosis.

Methods

A literature review was performed by means of the databases Lilacs, Scielo, Pubmed, and Scopus, combining the following DeCS/MeSH keywords: “Congenital Toxoplasmosis” and “Speech”, “Toxoplasmosis Congenital” and “Language” (Portuguese and English language). These keywords were selected to find articles about the characteristics of language development in children with a history of toxoplasmosis, considering that more researches with focused on hearing issues.

Were considered as inclusion criteria:

1. Studies concerning speech and/or language disorders in congenital toxoplasmosis;



2. Articles been published in Portuguese, English or Spanish;
3. Without time limitation;
4. Without limitation as to the type of study.

Were considered as exclusion criteria:

1. Articles discussing other topics of Congenital Toxoplasmosis
2. Not available in full text.

The search was carried out at a VPN system of the University to guarantee the access of more articles in their full format.

Analysis of the articles of the literature search was performed in two steps, at first, articles were selected by their titles and abstracts. When they contemplated the inclusion criteria, they were read in full text. The included articles were analyzed about their objectives, methods, results and conclusions.

Results

28 papers were found by the search strategy (Lilacs 2, Scielo 0, Pubmed 11 and Scopus 15), all published in a time interval from 1984 to 2015. Most of the articles were located in Scopus and Pubmed database (Figure 1).

After application of the inclusion criteria, two articles were included in the present study, published in 2010 and 2014. In Table 1, are listed the details of the literature review, including author, year of publication, filiation of the main author, country, study design, objectives, methods and results.

Discussion

Several studies, discussing visual impairment and hearing disorders associated to congenital toxoplasmosis, already mentioned the possibility of language de-

Table 1: Results of literature review, including author, year of publication, filiation of main author, country, study design, objectives, methods and result.

Author, Year	Filiation of Main Author, Country	Type of Study	Objectives	Methods	Results
Resende, et al., 2010 [15]	University of Minas Gerais, Brazil	Cross-sectional Study	To describe the auditory and language outcomes of children with early diagnosis and treatment for congenital toxoplasmosis	All children diagnosed with congenital toxoplasmosis at the Minas Gerais State Neonatal Screening Program	28 children (26.4%) with language disorders. In univariate analysis, visual impairment and/or ocular lesions were not associated with hearing and/or language impairments ($p = 0.86$ and $p = 0.39$). The language deficit was associated with hearing disorders as central dysfunction and conductive hearing loss.
Corrêa, et al., 2014 [16]	University of São Paulo, Brazil	Case Report	To describe the language evaluation and speech therapy intervention in a boy with history of congenital toxoplasmosis	A child, six-years-old, underwent 45 sessions of speech therapy, phonological, semantic, syntactic and pragmatic language, as well as psycholinguistics abilities were evaluated	It was observed improvement in all aspects evaluated, but the child maintained difficulties in communication, not expected for his age.

velopment disorders [11-14]. However, was observed that there was no standardization of the use of tests to measure the monitoring of speech-language performance. The use standardized tests for the diagnosis of speech-language disorders allows the careful monitoring of each patient, as well as the sharing of results with the scientific community, aiming at better planning of health promotion actions as well as new proposals for speech-language therapy treatment.

This review of the literature found two studies about the language development in congenital toxoplasmosis children, which were recently published in 2010 and 2014, respectively, one originated in Lilacs and the other in Scopus. Both of them were performed in Brazil, it is a cross-sectional study and the other a case report.

The description of auditory and language outcomes in children with early diagnosis and treatment for congenital toxoplasmosis verified that 26.4% of the enrolled population showed language disorders [15]. This study used a standardized protocol to evaluate the language development, Language Development Assessment (ADL), which allows identifying impairments in language acquisition based on the scales for receptive and expressive language [16]. The authors classified the children with or without language disorders, but they did not describe which aspect of language development was more committed to congenital toxoplasmosis. In contrary to the initial hypothesis of this study, visual impairment and/or ocular lesions were not associated with hearing and/or language impairment, that is hearing and language outcomes occur independently of others sequelae from this infection. However, the small sample size might be a limiting factor for stronger conclusions.

In a case report, they observed that sessions of language intervention by a speech-pathologist provided an improvement in the phonological processes, in the abilities of denominations and of psycholinguistics. The most expressive gains were shown in the auditory-vocal abilities. Thus, speech therapy showed to be an important therapeutic tool to induce improvements in phonological, semantic, syntactic and pragmatic levels, but, despite these results, the child was still in lag considering the neuropsychological development of the chronological age [17].

The results of this research showed the importance to carry out further research on this topic, and that health professionals in attending a patient with a history of toxoplasmosis should consider the possibility of language alterations.

Conclusion

Congenital toxoplasmosis could be associated with communication disorders, specifically with language disorders, however, our search strategy found only a few studies with low and moderate level of evidence.

New research should be realized on this subject, clarifying the associations between language and congenital toxoplasmosis, using the diversity of standardized protocols to elucidate the details considering all levels of expressive and receptive language. In this way, it will be possible to trace the profile of language changes expected for individuals with congenital toxoplasmosis.

Financing

None.

Conflict of Interests

None.

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